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10/601,602	06/23/2003	John R. Jackson	FC-10	8940

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EXAMINER	
WILKINS III, HARRY D	

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 03/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/601,602	JACKSON ET AL.	
	Examiner	Art Unit	
	Harry D. Wilkins, III	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 February 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) *1-7 and 18-33* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8-17,34 and 35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 June 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 8-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant has not enabled one of ordinary skill in the art to make a "low" alkali metal ion transport efficiency because no composition has been fully described which meets the limitation, nor has a specific example been provided which meets the limitation. One of ordinary skill in the art, upon reading the specification, would have had no idea how to make a permselective membrane with the claimed low alkali metal ion transport efficiency having less than 60% transport efficiency, much less less than 20% transport efficiency.

3. Further in support of the position, the Examiner submits "Recovery of Sodium Hydroxide from Alkaline Waste Solutions", which describes various membranes, both polymeric and ceramic, and show that the sodium ion transport efficiency (migration efficiency) depends, not only on the membrane composition, but also the operating conditions in which the membrane is used. This cast further doubts as to how to make the invention as claimed. Can the invention be practiced with a membrane, which

normally exhibits high transport efficiency, in such a way that the membranes inherent transport efficiency is lowered to be considered "low"?

4. Since the only disclosure of a composition of the membrane (see the first paragraph of page 14) merely states that a copolymer of tetrafluouethylene and a perfluorovinyl monomer, one of ordinary skill in the art can only assume that every copolymer of that type had the claimed property.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 8-12 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Kelham (US 4,902,397) with evidence from deNora (US 4,340,452) and deNora et al (US 4,381,979) (for claim 13 only).

Kelham anticipates the invention as claimed. Kelham teaches (see figures, abstract and col. 6, line 28 to col. 7, line 4) an assembly including an electrolytic cell (1) including a Nafion® membrane (6) (a copolymer of tetrafluoroethylene and perfluorovinyl ether with sulfonic or carboxylic ion-exchange groups (see deNora at col. 11, lines 32-48)), separating the cell into an anode compartment (2) and a cathode compartment (4), a catalytic, metal anode (3) and a catalytic, metal cathode (5). The assembly further included gas and liquid disengagers (12, 18) for each of the catholyte and anolyte streams. Although the vessels (12, 18) of Kelham are not referred to as gas and liquid

disengagers, they would have functioned as such since any liquid entrained in the gas flow (11, 17) entering the vessels would have settled to the bottom of the vessel to rest on membrane (15, 21) and not pass out of the vessel by the exit (16, 22).

Regarding claims 8-11 and 17, since the only disclosure of a composition of the membrane (see the first paragraph of page 14) merely states that a copolymer of tetrafluouethylene and a perfluorovinyl monomer was suitable for achieving the claimed alkali metal ion transport efficiency, one of ordinary skill in the art can only assume that every copolymer of that type had the claimed property.

Regarding claim 12, Kelham teaches a platinum oxide coated titanium anode. and a "known" electrocatalyst coated nickel cathode. The "known" electrocatalyst coating can be seen in deNora et al ('979) at col. 4, lines 38-47, which shows that the coating was a platinum group metal oxide.

7. Claim 34 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Sawamoto et al (US 5,290,406).

Sawamoto et al clearly anticipate the invention as claimed. Sawamoto et al teach (see figure, abstract and col. 5, lines 30-60) an assembly including an electrolytic cell divided by a permselective polymer membrane, a metal anode and a metal cathode, and further included gas/liquid separators (i.e.-disengagers) (16, 5) for each of the catholyte and anolyte streams.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 8-12, 14 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Cohn et al (US 4,486,276) with evidence from deNora (US 4,340,452) in view of Sawamoto et al (US 5,290,406).

Cohn et al teach (see figures, abstract and paragraph spanning cols. 3 and 4) an electrolytic cell divided into an anolyte compartment and catholyte compartment by a Nafion® membrane (a copolymer of tetrafluoroethylene and perfluorovinyl ether with sulfonic or carboxylic ion-exchange groups (see deNora at col. 11, lines 32-48)), a catalytic, metal anode and a gas diffusion cathode.

Thus, Cohn et al do not teach the gas and liquid disengagers for each of the catholyte and anolyte streams.

Sawamoto et al teach (see figure and col. 5, lines 30-60) teaches including gas/liquid separators (i.e.-"disengagers") for effluent anolyte and catholyte streams of an electrolytic cell for the purpose of removing any liquid trapped in the product gas stream to create a purified gas stream.

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated gas/liquid separators into both the anolyte and catholyte discharge streams of the cell of Cohn et al because Sawamoto et al teach that the separators create a purified gas product stream devoid of any entrained liquid.

Regarding claims 8-11 and 17, since the only disclosure of a composition of the membrane (see the first paragraph of page 14) merely states that a copolymer of

tetrafluouethylene and a perfluorovinyl monomer was suitable for achieving the claimed alkali metal ion transport efficiency, one of ordinary skill in the art can only assume that every copolymer of that type had the claimed property.

Regarding claim 12, Cohn et al teach (see col. 6, lines 50-58) using a ruthenium-oxide coated titanium or tantalum anode.

Regarding claim 14, Cohn et al teach a gas diffusion cathode.

10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kelham (US 4,902,397) in view of deNora et al (US 4,381,979).

The teachings of Kelham are described above. Kelham teaches an electrocatalytically coated nickel cathode.

Kelham does not teach that the cathode coating was a precious metal oxide coated on nickel or titanium.

DeNora et al teach (see col. 4, lines 38-47) a platinum group metal oxide coated on a substrate as the cathode.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the known electrocatalyst coating of deNora et al as the electrocatalyst coating of Kelham because the coating of deNora et al had low hydrogen overvoltage.

11. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kelham (US 4,902,397) in view of Brown et al (US 4,426,269).

The teachings of Kelham are described above. Kelham teaches an electrocatalytically coated nickel cathode.

Kelham does not teach that the cathode coating is selected form the group consisting of Ni-Mo, Co-Mo, Ni-W, Co-W, Ni-Fe and Ni-Co.

Brown et al teach (see abstract) an electrocatalytic coating of a Ni-Mo, Ni-W, Co-Mo or Co-W alloy.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the known electrocatalyst coating of Brown et al as the electrocatalyst coating of Kelham because the coating of Brown et al had improved catalytic stability (col. 1, lines 7-9).

12. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kelham (US 4,902,397) in view of Kuo et al (US 4,105,531).

The teachings of Kelham are described above. Kelham teaches an electrocatalytically coated cathode.

Kelham does not teach that the cathode coating was an alloy of Mo, V and Ni on a copper substrate.

Kuo et al teach (see abstract) a copper substrate coated with an alloy of Mo, V and Ni that has electrocatalytic activity.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the known electrocatalyst cathode of Kuo et al as the electrocatalyst cathode of Kelham because the cathode of Kuo et al had improved conductivity and corrosion resistance.

13. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sawamoto et al (US 5,290,406) in view of deNora et al (US 4,381,979).

Sawamoto et al teach that the anode was made from catalytic β-lead dioxide. The lead oxide was specifically used to produce ozone.

However, it would have been obvious to one of ordinary skill in the art to have adapted the assembly to produce other products.

DeNora et al teach (see col. 8, lines 26-61) a platinum group metal oxide coated on a titanium substrate as the anode. This anode has low chlorine overvoltage when used to produce chlorine gas.

Therefore, it would have been obvious to one of ordinary skill in the art to have substituted the anode of deNora et al for the anode of Sawamoto et al to adapt the cell of Sawamoto et al for making chlorine gas as taught by deNora et al because the electrocatalytic anode of deNora et al had low chlorine overvoltage.

Response to Arguments

14. Applicant's arguments filed 2 February 2006 have been fully considered but they are not persuasive. Applicant has argued:

a. The claims are enabled.

In response, the Examiner continues to disagree. Applicant has not shown any example of a composition which meets the claimed "low alkali metal ion transport efficiency". One of ordinary skill in the art would not have been able to determine which membranes would infringe the claimed property without undue experimentation. A search of the prior art, and even the Internet, do not turn up any data on commercially available membranes as to the sodium ion transport efficiency, so this property would need to be tested for each and every membrane to determine if it were suitable. One of

ordinary skill in the art would have not been able to make or use the invention commensurate in scope with the claims as Applicant has not provided examples of the membranes which meet the claimed sodium ion transport efficiency. It also appears that Applicant may also be concealing the best mode of the invention since no example of the invention setting forth a membrane that is suitable for use (i.e.-meeting the claimed sodium ion transport efficiency) has been disclosed. What membrane is the Applicant using to achieve a sodium ion transport efficiency below 20%? Such membrane is certainly not disclosed by the specification as filed.

b. Nafion® membranes (perfluourosulfonic acid polymer) are considered a genus, of which specific membranes are considered to be the species of the present invention of low sodium ion transport efficiency, thus, Kelham or Cohn et al merely teach a genus, and does not anticipate the claimed species.

In response, this is not found persuasive. Since neither the prior art nor Applicant has provided guidance on how to determine which ion selective membranes meet the claimed property, the Examiner must make the assumption, absent objective evidence to the contrary, that every membrane of the type described by Applicant has the claimed property. Until Applicant submits data showing that the membrane disclosed by the prior art does not have the claimed property, the *prima facie* case of anticipation/obviousness stands.

c. None of the references cited by the Examiner teach a cell for producing an alkali metal halite.

In response, the present claims are apparatus claims. The argued feature is related to the manner of operation of the claimed structure, and as such, has not been given patentable weight. See MPEP 2114.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw